## CLAIMS

1. A method of fabricating an aligned optoelectronic waveguide circuit by writing waveguides between a plurality of laser diodes and a fiber channel, said method comprising the steps of:

depositing a cladding layer on a substrate;

curing the cladding layer;

placing a plurality of laser diodes on the cladding layer in a plurality of selected positions;

depositing a light sensitive core polymer over the cladding layer and over the plurality of laser diodes to form a core layer;

locating the emitting centers of the laser diodes with a precision writing system;

writing the waveguide regions in the core layer between the light emitting centers of the laser diodes and the fiber channel or a branch thereof with a collimated light beam;

developing the core layer with a solvent; and

removing the unexposed regions of the core layer.

2. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 1 comprising the additional step of:

encapsulating the optoelectronic circuit with a low-index cladding polymer.

3. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 1 wherein the step of depositing a higher index core polymer over the cladding layer and over the plurality of laser diodes to form a core layer encapsulates the cladding layer and the laser diodes.

4. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 1 further comprising the additional steps of selecting the core layer as a ultra-violet cross-linkable polymer and providing the collimated light beam as a ultra-violet light beam.

5. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 1 wherein the step of writing of the waveguide regions creates a separate waveguide between each of the plurality of laser diodes and the fiber channel or a branch thereof.

6. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 5 wherein the step of writing the waveguide regions creates at least some of the waveguides between each of the plurality of laser diodes and the fiber channel or a branch thereof in generally S shape.

7. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 1 comprising the additional step of selecting the cladding layer as a light curable optical polymer.

8. A method of fabricating an aligned optoelectronic waveguide circuit by writing waveguides between a plurality of laser diodes and a fiber channel, said method comprising the steps of:

depositing a buffer layer on a substrate;

depositing an active core layer on the buffer layer;

depositing a low-index cladding layer over the active core layer;

etching a trench into the deposited layers to a depth that aligns a plurality of laser diodes with the active core layer;

placing a plurality of laser diodes in the etched trench in a plurality of selected positions;

locating the emitting centers of the laser diodes with a precision writing system; and

writing the waveguide regions in the active core layer between the light emitting centers of the laser diodes and the fiber channel or a branch thereof with a writing beam.

9. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 comprising the additional step of:

encapsulating the optoelectronic circuit with a low-index cladding polymer.

10. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 wherein the step of writing of the waveguide regions creates a separate waveguide between each of the plurality of laser diodes and the fiber channel or a branch thereof.

11. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 10 wherein the step of writing the waveguide regions creates at least some of the waveguides between each of the plurality of laser diodes and the fiber channel or a branch thereof in generally S shape.

12. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 comprising the additional step of selecting the buffer layer as a low-index passive polymer.

13. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 wherein the step of depositing the buffer layer on the substrate is done by spin coating.

14. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 comprising the additional step of selecting the active core layer from a higher refractive index polymer.

15. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 wherein the step of etching a trench into the polymer layers is done by reactive ion etching with an oxygen plasma.

16. The method of fabricating an aligned optoelectronic waveguide circuit as claimed in accordance with claim 8 wherein the step of writing the waveguide regions in the active core layer aligns the dipole molecules in the active core layer and changes the refractive index of the written waveguide regions in the active core layer.